Conference report

Equity in disease prevention: Vaccines for the older adults – a national workshop, Australia 2014

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A B S T R A C T

On the 20th June, 2014 the National Health and Medical Research Council’s Centre for Research Excellence in Population Health “Immunisation in under Studied and Special Risk Populations”, in collaboration with the Public Health Association of Australia, hosted a workshop “Equity in disease prevention: vaccines for the older adults”. The workshop featured international and national speakers on ageing and vaccinology. The workshop was attended by health service providers, stakeholders in immunisation, ageing, primary care, researchers, government and non-government organisations, community representatives, and advocacy groups. The aims of the workshop were to: provide an update on the latest evidence around immunisation for the older adults; address barriers for prevention of infection in the older adults; and identify immunisation needs of these groups and provide recommendations to inform policy.

There is a gap in immunisation coverage of funded vaccines between adults and infants. The workshop reviewed provider misconceptions, lack of Randomised Control Trials (RCT) and cost-effectiveness data in the frail elderly, loss of autonomy, value judgements and ageism in health care and the need for an adult vaccination register. Workshop recommendations included recognising the right of elderly people to prevention, the need for promotion in the community and amongst healthcare workers of the high burden of vaccine preventable diseases and the need to achieve high levels of vaccination coverage, in older adults and in health workers involved in their care. Research into new vaccine strategies for older adults which address poor coverage, provider attitudes and immunosenescence is a priority. A well designed national register for tracking vaccinations in older adults is a vital and basic requirement for a successful adult immunisation program. Eliminating financial barriers, by addressing inequities in the mechanisms for funding and subsidising vaccines for the older adults compared to those for children, is important to improve equity of access and vaccination coverage. Vaccination coverage rates should be included in quality indicators of care in residential aged care for older adults. Vaccination is key to healthy ageing, and there is a need to focus on reducing the immunisation gap between adults and children.

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1. Introduction

The proportion of adults that are over the age of 60 in Australia is expected to increase from the current 14% to 25% in 2056. This has implications for the future workforce age distribution and the quality of life of the elderly. The definition of quality of life for the older adult is derived from the World Health Organization’s definition of health as a state of complete physical, mental and social wellbeing [1], with the emphasis on physical health and functional ability [2].

There are more people aged 85 years and older in aged care facilities now [3] with the average length of stay in an aged care facility being 2.8 years, an 11% increase over the last decade. Therefore the wellbeing of people in aged care facilities is becoming an increasingly important issue [3,4].

In 2010, infectious diseases were leading contributors to the burden of disease in people aged 60 years and older [5]. Influenza, pneumococcal and varicella zoster are vaccine preventable diseases but remain a significant cause of morbidity and mortality among older adult population [4]. Older adults are at higher risk of contracting many vaccine preventable diseases, and do not respond well to treatment. They are therefore at higher risk of suffering serious complications, disability and death from these diseases.

This report describes the presentations and discussions during the panel session on “How good is good enough for the elderly?” a title which reflects the lower immunogenicity of vaccines in older adults due to immunosenescence, negative provider attitudes to elderly vaccination, and the lower uptake of vaccines in this age group. The workshop was attended by Australian health service providers, stakeholders in immunisation, ageing, primary care, researchers, government and non-government organisations, community representatives, and advocacy groups. The aims of the workshop were to: provide an update on the latest evidence around immunisation for the elderly; address barriers for prevention of infection in the elderly; and identify immunisation needs of these groups and provide recommendations to inform policy and improve disease prevention in older Australians.

2. Impact of vaccine preventable diseases on quality of life

Maintaining function is a key ingredient to enablement, quality of life and the prevention of the deleterious effects of immobility and inactivity for older adults [6]. Preventable illnesses such as, shingles, pneumococcal disease, influenza and pertussis and their sequelae can result in death or reduced activity and function, which may push people over a threshold from living independently into permanent disability.

Participation and social inclusiveness are very important for the overall wellbeing of elderly Australians [7]. Social isolation is another result of acute illness and/or the resulting disability, which can be a risk factor for other diseases and disability.

There are substantial impacts on nursing homes residents, causing morbidity, disability, dependency and reducing quality of life. Once older adults in aged care facilities become disabled they become a much greater burden to staff, which further reduces social connection and quality of life [8]. Other impacts are on the cost of care at emergency departments and inpatient wards, and the possibility of nosocomial transmission of preventable infectious diseases to and from the older adults. Nursing home outbreaks have major health and economic consequences [9]. Disease prevention is a means of promoting positive ageing, preventing suffering and improving quality of life. It is possible the benefit of vaccination in improving quality of life for the elderly is not valued as highly as gaining years of life [3,4].

Another reason for the under-use of vaccines is their lower effectiveness in older adults compared to younger populations. However, there is a heavier burden of many vaccine preventable diseases in this group, compared to younger populations. Therefore there may still be substantial overall public health benefit to be gained from the use of vaccines when the burden of disease is high [10]. In fact, vaccines have higher efficacy compared to many other widely used preventative public health strategies for the older adults such as statins and anti-hypertensive treatments, and it may be more appropriate to compare adult preventive strategies with other accepted adult preventive strategies than with infant vaccination [11].

In public health, many accepted interventions such as statins and smoking cessation have preventive efficacy of less than 30% [12,13]. Yet health practitioners often dismiss as unworthy vaccines with efficacy less than 80%. Therefore a paradigm shift is required to view vaccines in the elderly in terms of burden of disease and efficacy, not efficacy alone.

2.1. Shingles

Shingles has a large impact on the quality of life of older adults, much of which is not captured in standard cost effective analysis of vaccines [14].

At least 10–20% of the older adults who develop shingles will develop post herpetic neuralgia (PHN). The mean duration of PHN is 3.3 years [15]. A nationwide survey of the impact of shingles on quality of life of seniors found that their ability to work was adversely affected in 32% of case [7], and participation in social and community activities was impacted in around half of cases. Most shingles patients who report with post herpetic neuralgia (PHN) require substantial assistance from family members.

Vaccination is the only intervention that has proven to be effective in prevention of shingles [15,16]. A single dose of zoster vaccine is recommended for adults 50 years of age and older who have not received a dose of zoster vaccine. A study involving participants aged >60 years showed an overall reduction in the population incidence of herpes zoster of 51.3% and the incidence of PHN by 66.5% [16]. (Note: On 9 May 2015 the Australian Government announced funding for a single dose of zoster vaccine for those aged 70–79 years [17].)

2.2. Pneumococcal disease

The effectiveness of pneumococcal vaccine is particularly important in nursing home residents, the majority of whom are frail older adults and have co-morbidities. There is scarce research on the effectiveness of pneumococcal vaccines in nursing homes. A study in Hong Kong [18], showed effectiveness of 40% for pneumococcal vaccines among older adults in nursing homes. Other studies [19] large randomised controlled trial (CAPiTA) examined the efficacy of PCV13 in preventing invasive pneumococcal disease the population 65 years of age and older found a vaccine efficacy of 75% against invasive disease and 48.8% against pneumonia, although this was not in nursing home residents [20]. The 13-valent conjugate vaccine [20] is currently licensed for use in people aged ≥ 65 years and it is funded under the NIP.

2.3. Influenza

The majority of deaths caused by influenza occur in people aged 65 years and over. The frail older adults suffering from chronic conditions and residents of aged care facilities are at higher risk of outbreaks. A meta-analysis of 35 test-negative case-control studies found that influenza vaccination of the older adults was associated with a significant reduction in the risk of hospitalization for pneu-
Pertussis notification rates in Australia 1995–2010 have increased significantly in older age groups [26]. Nursing home outbreaks of pertussis have also been documented. There is significant morbidity associated with pertussis infection in infants <6 months of age and household contact is often the source of infection in infants [23]. One third of working mothers have a grandparent providing childcare for children under school age. Unvaccinated carers put infants at risk of severe disease and death. Pertussis vaccine is recommended for adults aged 60 years and older at increased risk from pertussis. However, this recommendation is not funded under the NIP [23]. It has traditionally been believed that pertussis is only fatal in infants, but there are documented deaths from pertussis in elderly Australians in recent years, highlighting the risk to the older adults from this infection [10].

3. Vaccination schedule for adults – National Immunisation Program (NIP)

Guidelines of Australia and New Zealand society of geriatric medicine have recommended vaccination for influenza, pneumococcal disease, tetanus and shingles, and for those who are regularly in contact with children, pertussis. At the time of the workshop, only influenza and pneumococcal polysaccharide vaccines were funded under the National Immunisation Program (NIP), whereas for children vaccines are funded for 13 diseases and there are no vaccines that are recommended but unfunded. The cost of unsubsidized vaccines can be high and unaffordable for older adults and pensioners.

One of the key issues is that infant vaccination is applicable to a single birth cohort per year, and is therefore less costly to initiate than a recommendation for all adults >65 years, which represents numerous birth cohorts and a much larger initial investment in funding. For example, in Australia, approximately 250,000 children are born each year, so that a single birth cohort represents 1% of the population - in contrast, there are approximately 3,300,000 people >65 years, representing 15% of the population [27]. Therefore initial government investment for a new adult vaccination program recommended for everyone aged >65 years would be 15 times greater than for a new infant program, for a vaccine of the same price. Potential strategies to overcome this problem include staged vaccine programs, which may commence with a narrower age group initially and then expand to wider age groups.

Vaccines are provided free once they are included on the National immunisation program. These decisions are made by the Pharmaceutical Benefits Advisory Committee (PBAC), where the mechanisms are better suited to drugs and products serving young people [28]. Discounting heavily biases against vaccines compared to drugs, as benefits accrue in the distant future compared to the immediate benefit of drugs. Current PBAC considerations of persistence of immunity and life expectancy favour vaccines used in children, and substantial potential improvements in quality of life in older adults are undervalued. If a vaccine is shown to be effective in the elderly but does not satisfy PBAC requirements, there could be alternative mechanisms to subsidise it to improve access by the elderly.

4. Challenges of adult vaccination

There are significant barriers to vaccination of older adults that are not present for younger age groups. These include access to care, mobility, multiple providers, lack of provider confidence in adult vaccination, lack of clinical trial data in the frail elderly, and a paediatric immunisation culture [10]. Vaccination rates for funded adult vaccinations (50–70%) are much lower than they are for funded childhood vaccines (>90%), which highlight the challenge of adult vaccination. In the absence of an immunisation register that includes older adults, or a universal health record, it is often difficult to track which vaccinations have been given. Older adults may have multiple vaccines providers, which makes vaccination tracking more difficult. The introduction of a whole of life immunisation register in 2016 will overcome these difficulties. A major barrier is the fact that many health providers do not have confidence in the effectiveness of vaccinating older adults. This is compounded by the lack of vaccine clinical trials which include frail elderly [29,30], resulting in a scarce evidence base. As the population ages, it is important to increase the evidence-base by including frail elderly in clinical trials, or the lack of provider confidence in vaccines will be difficult to change. Newer data show that novel adjuvants and other innovations can overcome immunosenescence in the elderly [31]. The focus of vaccine research should continue to be on improving immunogenicity in the frail elderly, and results of such research need to be communicated to health providers to drive change in immunisation practice and improve uptake.

4.1. Immunological changes in aged population

The ageing process includes numerous immunological changes. Factors that lead to immunosenescence are complex, involving a combination of frailty, disability, co-morbidity and a predictable age-related immunological decline after the age of 50 [10], a wide range of defects in cellular and humoral immunity occur with ageing, and accelerates with increasing age. Immunosenescence may affect young age groups as well as old, however cell mediated immunity wanes exponentially after the age of 50 years [32], and waning immunity makes vaccines less effective in the elderly.

However, novel approaches to vaccination can improve immune responses in older adults, – for example, a phase 3 trial of an inactivated herpes zoster vaccine have shown 97% efficacy in the older adults, which surpasses the efficacy of many childhood vaccines [31]. Use of a higher dose inactivated influenza vaccine has been found to be significantly more effective in prevention of influenza than standard-dose vaccine [33]. Further, a schedule of 7-Valent Pneumococcal Conjugate Vaccine (PCV7) – 23-valent pneumococcal polysaccharide vaccine (23vPPV) prevents waning of antibody more than either vaccine used alone, suggesting that
using both vaccines could improve protection in the older adults [34]. One study [35] shows that conjugated pneumococcal vaccines had significant impact on prevention of invasive pneumococcal disease (IPD) in vaccinated and non-vaccinated elderly, young adults and younger children. In another study [36] herd immunity was demonstrated in adults following use of the trivalent- live attenuated influenza vaccine (CAIV-T) in children, which resulted in an indirect protection of 8–18% against medically attended acute respiratory illness in adults $\geq 35$ years of age. Vaccinating younger age groups to protect the elderly through herd immunity effects could be considered in some situations. The workshop recommended the development and support of novel vaccine technologies and strategies to overcome the reduced efficacy which results from immunosenescence and other age associated defects in vaccine response.

4.2. Absence of a whole of life register for adult vaccines

Computerized clinical and immunisation registers are useful tools for providing detailed information about vaccination coverage in the population [37]. A whole of life approach to vaccination is needed and this should be equally accessible to all ages.

A lack of access to immunisation records has major impact on vaccination rates, especially in adults who are a mobile population, often with multiple health providers. Patient recall has been the main method of getting information on vaccine history among older adults, and is known to be inaccurate [38]. This is particularly difficult where older adults visit different General Practitioners (GPs) and may have several different hospital admissions [39]. This will have an impact on coverage, where for example GPs are reluctant to give pneumococcal vaccines due to incomplete or absent immunisation records the possibility that a patient might have received it previously. A register will enable timely reminders for adult vaccination.

A European study found that countries which had developed universal mechanisms to record and monitor uptake of vaccines, and clear national objectives to increase older adults’ vaccine uptake, had higher vaccine uptake compared to the countries which didn’t [40]. Interventions facilitated by registers, such as sending personal letters offering free vaccination, showed on average higher vaccine coverage among older adults than settings with less developed vaccine management systems [39]. The presence of additional policy elements such as giving incentives to health care workers, vaccination reimbursement systems and awareness campaigns leads to increases in vaccine coverage among older adults.

The Northern Territory Immunisation Register (NTIR) contains records of vaccines administered to adults and children in the Northern Territory since 1991. Immunisation records from childhood vaccines programs, school-based vaccination programs, adult vaccines and travel vaccines are all recorded on the register. This is an example of a valuable and cost effective mechanism that can be used countrywide. In the absence of a register, a pocket-sized immunisation card with immunisation history recorded on it could be kept in an easy to reach place such as with the pension card, to allow easy access of immunisation records for older adults. The workshop recommended investigating a range of possible ways of keeping a universal record of immunisation, such as an adult immunisation register, Facebook/health book (healthy.me) and electronic health records. A whole of life register will commence in 2016 in Australia. We recommend that GP’s be able to access the immunisation register to check vaccination status of adults and that it record country of birth, parents’ country of birth, refugee status, Indigenous status, and residence in aged care facilities as flags for risks of under immunisation or infection. ‘Visiting Friends and Relatives’ travel is a major source of imported infections and may affect second generation adult migrants [41]. For recording of vaccination, data recording which distinguishes between polysaccharide vs conjugate pneumococcal vaccine and trivalent vs quadrivalent influenza vaccine is needed. Reminder systems for adult vaccination should be built into the register.

4.3. Health care provider attitudes to adult vaccination

Doctors’ recommendation to vaccinate plays a significant role in the decision to be vaccinated, even in people with negative perceptions of vaccination [42]. Healthcare workers’ attitudes to vaccination of older adults and their own vaccination status are important factors influencing recommendation of vaccination. Firstly, a lack of awareness about adult vaccines by health care professionals and the public is a major barrier to adequate vaccination rates in elderly Australians. In general, doctors and providers are less convinced about vaccines for the older adults than they are for children [10]. Adult vaccination may be a low priority during GP visits, when multiple acute medical conditions take precedence.

Institutional protocols to identify patients needing vaccination and ensuring vaccination can improve uptake [43,44]. Health care workers are at risk of acquiring infectious diseases, and vaccines are effective in preventing transmission between health care workers and their patients in aged care facilities [45]. However, staff vaccination rates are still low, especially among staff working in aged care facilities. Recommending vaccination to employees, providing free vaccination, on site, and requiring vaccination as a condition for being employed, are associated with higher employee influenza vaccination rates [46].

There is evidence that text messaging, accessing immunisation campaign websites, using patient-held web-based portals and computerized reminders increase immunisation coverage rates, especially when recommended by health care providers [46]. The workshop recommended mandatory vaccination for staff and the maintenance of staff vaccination records. Aged care facilities should be a particular focus, and be required to have a vaccination policy linked to accreditation, which recommends staff vaccination including influenza, preferably provided free in the workplace, and accompanying education campaigns. Advanced care planning is becoming more common and more systemised, however vaccination is rarely included in advance care plans.

4.4. Lack of vaccine awareness among public and older adults

The senior population and the community in general do not fully appreciate the risks of adult vaccine-preventable diseases, the complications that may arise from vaccine preventable diseases, the benefit of vaccination, including prevention of cancer and myocardial infarction [11,47]. There are misconceptions and myths around flu vaccine, for example beliefs that influenza vaccine causes flu, which causes unwillingness among older adults to be vaccinated. Immunisation information resources and campaigns usually target children, and there is less promotional material for adult vaccination.

4.5. Scarcity of data

One major barrier for the PBAC to approve vaccines for older adults is a lack of data. There is insufficient research on immunisation among older adults due to the systematic exclusion of frail elderly and other minority groups from randomised control trials (RCTs) [30]. Reasons for excluding the frail elderly from participation in RCTs include multiple medical conditions, polypharmacy, dementia and decreased cognition, high mortality and high attrition rates affecting study power, longer recruitment processes (guardian consent), altered body-mass index, potential lower renal and hepatic clearance of drugs and risk of adverse events, isolation,
low mobility causing difficulty attending follow up, as well as poorer immunological responses [10]. Research on influenza vaccine, the most widely used vaccine in older adults, is more complex than other vaccines because it is an annual vaccine, and efficacy is affected by the degree of match with circulating strains. Therefore influenza vaccine trials should be run over multiple seasons to account for variability in circulating strains. There are few RTCs done on influenza vaccine as it is widely funded already, and consequently there are many observational studies, with accompanying biases. These difficulties lead to a vicious cycle of lack of evidence, lack of recommendation and lack of protection from vaccine preventable diseases. Studies of efficacy/effectiveness specific to the vaccine strains are needed. Even if influenza vaccine effectiveness against infection is found to be low, it may be more effective against severe disease. There are also substantial indirect costs of infections, which are not considered by PBAC, and can be difficult to measure. These include effects of vaccine preventable diseases on quality of life, such as being put in aged care as a result of herpes zoster, and costs to carers if increased home care is required. More evidence is needed on these indirect benefits of vaccines in older adults.

5. Ethical challenges and ageism

The health care offered to older people is subject to a variety of ethical concerns. Factors associated with this are the increased frequency of illness including cognitive impairment in older people, assumptions of incapacity, diminished quality of life and impending mortality, and the increased vulnerability and loss of autonomy of the older person when acutely ill. Whilst infants, who also lack autonomy, have a parent as their advocate, elderly people may have no advocate and therefore be more vulnerable. Among clinicians, primary care physicians are best situated to assist elderly patients in exercising their autonomy in matters concerning health care decisions [48]. Some sub groups of older people are particularly at risk of being regarded as unworthy of preventive interventions, such as persons with dementia or people living in aged care facilities. Research has shown that the demented frail older people are less likely to be vaccinated than non-demented. In some settings older seniors >80 years are less likely to be vaccinated than those under 80 [42].

While the treatment offered to individuals may not be equal, treating individuals as equal is required for ethical resource allocation [49]. However, older people are not always considered of equal worth in our society, and ageist assumptions are entrenched. Research has found that health care workers treat older patients differently to younger patients, and often they are given lower priority which may result in withholding treatment, prevention or information [50]. Other studies [51,52] have shown that there is under-provision of community care and comprehensive approaches to health care for older adults, as well as over-utilisation of certain specialised services.

Elderly people are vulnerable to increased adverse events including errors of omission (that is where the required care is not provided) and errors of commission (where they experience harm based on a clinical intervention) [53]. Omission (such as failure to vaccinate) occurs where the individual’s age rather than their (potential or actual) underlying condition influences diagnostic decision making, particularly if cognitive impairment is present [54].

Older persons have a right to autonomy, self-determination and informed choice about vaccines. Informed choice can only be made if older people are given access to information that affects their health. Decisions should arise from dialogue and avoid clinicians’ assumptions about what their older patients may want or feel is appropriate. Common clinical situations such as acute delirium (often a result of acute infection) in the older person with otherwise normal cognition can lead to temporary loss of autonomy, during which time health care decisions will be made for them. Decisions about vaccination should be taken in the context of exploring goals of care with the patient and aligning current and future decisions with these goals ideally in periods of stable health [55].

Patients without an advocate in health care are considered to be especially vulnerable. Vulnerability has been defined as susceptibility to any kind of harm, whether physical, moral or spiritual, at the hands of an agent or agency, a factor which needs to be recognized and negotiated in health care transactions [56].

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Table 1

Key workshop recommendations.

- Create a universal record, or register, of immunisation in older adults – investigate data linkage mechanisms to link adult immunisation data from various sources such as GP software, Medicare records, aged care facilities and primary care. The Northern Territory Immunisation Register (NTIR), Vaccination Information and Vaccination Administration System (VIVAS) in Queensland and the Monash model of immunisation service for high risk patients could be looked at as models.
- It is noted that a whole of life register was announced in May 2015. It is important that variables such as country of birth, parents’ country of birth and Indigenous status be well recorded, and that GPs be able to check immunisation status of patients.
- Country of birth, parents country of birth, residence in aged care facility, Indigenous status and refugee status be included in the new announced Australia Immunisation Register to enable GP’s identify risk of under immunisation. For recording of vaccination, the ability to distinguish between polysaccharide vs conjugate pneumococcal vaccine and trivalent vs quadrivalent influenza vaccine is needed. Reminder systems for adult vaccination should be built into the register. Create age-based health promotion messages and vaccination reminders similar to those for bowel cancer screening.
- In conjunction with the above point, improve record keeping for adult immunisation, such as keeping records in residential aged care, creating a grey book of immunisation record for older adults and linking seniors’ cards to vaccination records.
- Achieve and maintain high coverage by addressing two key issues: low coverage of vaccines which are funded under the National Immunisation program (NIP) and barriers to access for unfunded vaccines. Develop a separate set of guidelines and alternative mechanisms for the PBAC to subsidise vaccines for older adults.
- Reduce financial barriers.
- Address the imbalance of educational resources on immunisation by developing resources targeted at adults. In particular, education is needed around pneumococcal and shingles vaccines, which have lower vaccination rates compared to influenza vaccine.
- Include vaccination as a key component of advanced care planning for the older adults.
- Include vaccination rates as a key quality indicator for health care of the older adults and aged care facilities.
- Support informed and respectful discussions between clinicians, patients and families of the benefits and burdens of preventive health measures for older people in the context of advanced care planning. It is important to acknowledge and reflect on ageism and value judgements in health care.
- Mandatory, free, immunisation for staff of aged care facilities, and linking vaccination of staff and residents with accreditation.
- Ongoing, sustainable education for health care providers. The workshop also recommended increasing advocacy for the wellbeing of the older adults, including increasing of vaccination rates, through various media channels.
- Encourage research funders to support more research on new vaccine strategies for the older adults to address immunosenescence and age associated defects in vaccine response, such as higher doses, vaccine combinations, the use of boosters, adjuvants, novel technologies and protection through herd immunity.
6. Vaccination among older Aboriginal and Torres Strait Islanders

Australia’s Indigenous people, Aboriginal and Torres Strait Islanders, die at a younger age compared to the rest of population, however trends show a steady increase in the older Indigenous population and the number is projected to increase further in next two decades [57]. Aboriginals aged 50–55 years are entitled to health checks which includes reviewing of immunisation records [23]. There is better uptake of influenza and pneumococcal vaccines among the Indigenous population compared to the rest of older adults population [58]. The workshop saw that when Aboriginal people are engaged with their local communities’ health services, they tend to seek help and health care.

The Aboriginal Community Controlled Health Services play an important role in ensuring older adults are cared for and vaccinated. The drive to ‘mainstream’ Aboriginal Health Services may have a subsequent impact on the health (including vaccination rates) of people over the next decade, as older people lose access to culturally safe health.

7. Conclusions

The workshop highlighted a substantial immunisation gap between funded adult and infant vaccines, and explored the reasons for this gap. These include the fact that adults are a mobile population, sometimes with multiple health providers; the lack of an adult immunisation register; lack of provider confidence in elderly vaccination; ageism and value judgement in health care; and lack of an evidence base in vaccine trials in the elderly. Table 1 summarises the key recommendations of the workshop. There is a need for vaccine trials in frail elderly; for research on novel vaccine technologies to overcome the reduced efficacy which results from immunosenescence; for education of providers; elimination of financial barriers; awareness in the community and amongst healthcare workers of the high burden of vaccine preventable diseases and the need to achieve high levels of vaccination coverage. A whole of life immunisation register is key, and subsequent to this workshop Australia has introduced such a register, the Australian Immunisation Register. As the population continues to age, vaccination for promotion of healthy ageing is an available and low cost intervention which compares favourably to other accepted prevention strategies in public health.

8. Conflicts of interest

Rinae MacIntyre has received in-kind support or funding for investigator-driven research from BioCSL, Pfizer and GSK, and has been on vaccine advisory boards for GSK, Merck and Pfizer. She is a member of the ISG, and sits on influenza and pneumococcal working groups for the Australian Technical Advisory Group on Immunisation. Other authors have no conflicts of interest to declare.

Authors’ contribution

C. Rainea MacIntyre conceived, spoke at and ran the workshop upon which this paper is based. She gave a plenary titled “Is the glass half empty or half full – changing the paradigm of vaccination for the elderly” and was a chair of the panel discussion “How good is good enough for the elderly”. She conceived and contributed extensively to preparing of the manuscript.

Robert Menzies participated in preparing of the manuscript.

Michael Chapman participated in preparing of the manuscript, he was one of the panelists at the workshop and spoke on topic “Ethics perspective on value judgement in preventive health for the elderly”.

Joanne Travaglia participated in preparing of the manuscript and was one of the panelists at the workshop and spoke on topic “Ethics perspective on value judgement in preventive health for the elderly”.

Michael Woodward participated in preparing of the manuscript, he was one of the panelists at the workshop, and he spoke about “Under vaccination of the elderly”.

Lisa Jackson Pulver participated in preparing of the manuscript, she was one of the panelists at the workshop, and she spoke on topic “Staying strong and growing old: A Koori case study”.

Christopher J. Poulos participated in preparing of the manuscript; he was one of the panelists at the workshop and spoke about “Challenges of positive ageing in nursing homes sector”.

David Gronow participated in preparing of the manuscript, he was one of the panelists at the workshop, he spoke on the topic “Can the impact of Herpers Zoster on quality of life be improved?”.

Timothy Adair participated in preparing of the manuscript and he was one of the panelists at the workshop.

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